

1 **The children or the companion animal? Factors behind of dogs and cats' relinquishment**
2 **by their guardians in Portugal**

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24 ABSTRACT

25 In Portugal, relinquishment of dogs and cats, despite currently being criminalized, is still a
26 major animal welfare and public health problem. Thus, we developed a questionnaire in order to
27 understand the factors predicting the relinquishment of companion animals in Portugal. We
28 obtained 944 valid answers from people who have adopted companion animals, and never

29 relinquished a companion animal, and 105 valid answers from people – companion animal
30 guardians (36) and non-guardians (69) – who have relinquished one. With a view to analyse the
31 factors behind relinquishment only by companion animal guardians, from the total sample, the
32 authors specifically analyzed the surveys completed by 72 participants, divided into two groups:
33 REL (relinquisher, n = 36), i.e., guardians who had relinquished a companion animal and NREL
34 (non-relinquisher, n = 36) i.e., guardians who had never relinquished a companion animal.
35 Considering the whole sample (n = 72), the presence of children and type of dwelling
36 (apartment) were the only significant predictors for a participant to be in the REL group. Also in
37 the REL group, the time spent with the companion animal before relinquishing them was
38 significantly shorter if there were children in the household than if there were no children.
39 Guardians need to understand the time and space that companion animals require, and how this
40 might change over time. Fundamentally, individuals need to examine critically their
41 commitment to caretaking before adopting a companion animal.

42

43 **KEYWORDS:** Animal welfare, Cats, Causes, Dogs, Guardians, Relinquishment.

44

45 1. INTRODUCTION

46 In many households, companion animals such as dogs and cats are considered as family
47 members (Cain, 1985; Faraco, 2009). This suggests a form of family system composed of
48 humans and animals, an emerging new configuration that intrigues researchers around the world
49 (Faraco, 2009).

50 In Portugal, in 2020, 38% of the households had at least one dog and 32% had at least one cat
51 (FEDIAF, 2020), which reveals the importance of companion animals for the Portuguese
52 families.

53 Despite these bonds, relinquishment of companion animals, including both the legal process of
54 relinquishing a companion animal to a shelter and illegally abandoning them, is a major public
55 health and an animal welfare problem, not only in Portugal (Sousa & Soares, 2019), but also in
56 other countries. In Portugal, mistreatment and abandonment of animals is criminalized,

57 following the entry into force on October 1, 2014, of Law 69/2014. However, the abandonment
58 of companion animals persists in Portugal, as indicated in data reported by the Portuguese News
59 Agency reports (Lusa, 2019). Efforts to prevent relinquishment in Portugal include anti-
60 abandonment campaigns, including by the national Public Security Police (Sousa & Soares,
61 2019).

62 Microchipping companion animals might reduce the level of relinquishment (Fatjó et al., 2015).
63 In Portugal, the identification via microchip is mandatory by law for specific dogs (dangerous
64 breed dogs, potentially dangerous breed dogs, and hunting dogs) born from July 1, 2004
65 (Decree-Law no. 313/2003, of December, 17 and Ordinance no. 421/2004, of April, 24), and for
66 all dogs born from July 1, 2008. Following the Decree-Law no. 82/2019, of June, 27, all
67 companion animals in Portugal must be identified through the National companion animal
68 information system, extending the inclusion of microchips in cats. When this study was
69 launched in August 2016, the microchip was only mandatory for all dogs born in or after July
70 2008.

71 The reasons for relinquishment of companion animals have been researched by several authors
72 worldwide. According to the review by Coe et al. (2014), 84 articles that investigated these
73 issues, particularly in the United States, were published before 2012.

74 Relinquishment has several causes, which go through religious, cultural, socioeconomic,
75 demographic, ecological, and biological aspects and is closely related to the level of
76 socioeconomic development of countries (Salman et al., 1998). Risk factors for relinquishment
77 occur in both humans and nonhumans (Salman et al., 1998) and include lifestyle changes, health
78 problems, income, education, living situation, behavioral problems and other animal
79 characteristics (DiGiacomo et al., 1998; Scarlett et al., 1999; Marston et al., 2004; Dolan et al.,
80 2015). Another reason why people give up their companion animals is unrealistic expectations
81 placed on companion animals (Marder & Duxbury, 2008).

82 The aim of this research was to investigate guardian- and animal-related variables that might be
83 predictive of companion animal relinquishment in Portugal. The goal is to contribute to improve

84 rational prevention strategies, namely to better direct campaign messages and to improve
85 national legislation on animal protection.

86

87 2. MATERIALS AND METHODS

88 In order to achieve the mentioned objectives, a questionnaire was developed, in agreement with
89 the Ethics guidelines from the Ethical Committee issued by University of Porto. Before
90 launching the questionnaire online, it was piloted with 54 people from different ages, genders,
91 social and education levels. Afterwards, the corresponding author publicized the questionnaire,
92 informing about the hyperlink where it was hosted, clarifying its objectives and guarantying the
93 confidentiality and anonymity of the respondents. No personal information regarding the
94 respondent was requested. Participants were informed about the questionnaire via public posts
95 on Facebook (including Facebook forums with special interest in animal welfare, namely
96 sosanimal.org.pt, chaodosbichos.org, animaisderua.org), through the researchers' social
97 networks, and via e-mail through different personal mailing lists. The questionnaire was
98 constructed with mandatory fields and with specific validations to guaranteed the consistency of
99 the answers. The questionnaire is available on request from the corresponding author or can be
100 found, in Portuguese, at the following address: www.pet-survey.com.

101 Responders were required to refer to the last companion animal (dog or cat) they had adopted or
102 relinquished and they could fill the questionnaire as relinquishers, adopters or both. People who
103 had relinquished a companion animal could be either the former guardian of the companion
104 animal or non-guardians (e.g. someone who had found the companion animal as a stray or who
105 had been asked by the guardians of the companion animal to relinquish them).

106 The questionnaire included information on (i) companion animal demographics (age, gender,
107 sexual status, breed, weight, color, existence of microchip), (ii) respondent demographics (age,
108 gender, marital status, education) and household composition (number of family members,
109 existence of children, number of cohabitating dogs and cats, family income, past companion
110 animals), (iv) accommodation type (apartment or detached house), (v) reasons for collecting or
111 adopting the companion animal that was eventually relinquished, (vi) reasons for relinquishing

112 the companion animal, (vii) place of collection or adoption of the companion animal, (viii)
113 place where the companion animal was relinquished and (ix) how long the individual had the
114 companion animal before relinquishing them.

115

116 3. RESULTS

117 3.1. PARTICIPANTS

118 A total of 944 completed questionnaires relating to adoption and 105 regarding relinquishment
119 were received and were valid. From the 105 filled questionnaires about relinquishment, 69 were
120 questionnaires from individuals who were not the actual guardians of the relinquished animals.
121 These might be people who had found a dog or a cat wandering on the streets or abandoned in a
122 home or private space; or were asked to help the actual guardian to rehome the companion
123 animal due to a problem e.g., guardian's death, guardian aging, guardian's disease, or guardian's
124 arrest.

125

126 3.2. SAMPLES

127 The overall dataset included only a small number ($n = 36$) of respondents who declared they had
128 relinquished their companion animal in the past. Since the aim of the study was to identify
129 predicting factors for relinquishment, it was necessary to compare relinquishers (who were the
130 guardians of the companion animal and not those who, despite having relinquished, were not the
131 actual guardians of the relinquished animals) with non relinquishers, using a matched sample.
132 Therefore, the dataset was subsampled for further analysis to obtain balanced groups between
133 relinquishing and non-relinquishing respondents. Data from 72 respondents were therefore
134 analyzed after dividing them into two groups: REL (relinquisher, $n = 36$; i.e., all companion
135 animal guardians who had relinquished a companion animal in the past) and NREL (non-
136 relinquisher, $n = 36$; i.e., guardians who had never relinquished a companion animal). The
137 participants in the NREL group were randomly selected from the total sample of relinquishing
138 respondents using the True Random Number Generator (<http://www.random.org>) so that they
139 would equal in number the non-relinquishers.

140

141 3.3. DATA DESCRIPTION

142 For the great majority (78%) of the guardians who had relinquished their companion animal
 143 (REL sample), it was not their first experience with companion animals. Also, all REL actually
 144 had a companion animal that was different from the one they had relinquished. For the
 145 individuals who had relinquished a companion animal, the main reason for having adopted the
 146 companion animal they had later relinquished was for company (see Table 1, that also lists the
 147 places of origin of the relinquished companion animals).

148 **Table 1. Reasons for adopting and place of origin of the relinquished companion animals by**
 149 **the guardians**

| Reasons for adopting the relinquished companion animals | Dogs | Cats |
|--|-------------|-------------|
| Company | 14 | 4 |
| Security | 2 | 0 |
| Hunting | 0 | 0 |
| Breeding | 0 | 0 |
| Other reason | 9 | 7 |
| Place of origin of the relinquished companion animals | Dogs | Cats |
| Animal protection association | 4 | 1 |
| Municipal shelter | 0 | 1 |
| Breeder | 8 | 0 |
| Friend | 5 | 1 |
| Street | 2 | 3 |
| Born from another animal at home | 0 | 3 |
| Another place | 6 | 2 |

150

151 The individuals who had relinquished a companion animal (n = 36 guardians) were mostly
 152 female (n = 35). The same situation was observed in the NREL group (n = 34 females). The
 153 average age of REL group individuals was 36.4 years (SD = 10.3 years) being the average age
 154 of the NREL group individuals 36.7 years (SD = 11.0 years).

155 The majority (53%) of the REL individuals had only completed high school, 33% had a
 156 bachelor and 14% a master’s degree. The NREL individuals had a bachelor (44%) or a master’s
 157 degree (31%), with the remaining just completing the high school.

158 Regarding the annual household income, 31% of the relinquishers had a low income (less than
 159 10 000 euros). NREL were also mainly low-income families, with 25% with less than 10 000
 160 euros of annual income and 64% with less than 19 000 euros.

161 On average, the household of the REL group was composed by 3 people, considering both
 162 adults and children (SD = 1 person) and 36% have children below the age of 12 years and 52%
 163 below 18 years. The majority of these respondents lived in apartments (75%) and were tenants
 164 (58%). There were 2.4 people in the household of the adopters (SD = 1 person) and 14% have
 165 children under 12 years old and 19% under 18 years. A slight majority of the adopters lived in
 166 apartments (53%) and 44% were renters as opposed as homeowners.

167 *REASONS FOR THE RELINQUISHMENT INDICATED BY THE COMPANION ANIMAL*
 168 *GUARDIANS*

169 The reasons indicated for the relinquishment of the companion animal are presented in Table 2
 170 (the participants could choose more than one option), in decreasing order of frequency.
 171 Behavioral problems (29%) and personal and family problems (26%) were the main reasons for
 172 relinquishment.

173 **Table 2. Reasons for the relinquishment by the guardians**

| Category | Reasons ⁽¹⁾⁽²⁾ | Dogs | Cats | Total |
|-------------------|---|------|------|-------|
| General | Lack of time to care for the animal | 3 | 3 | 6 |
| Behavioral | Aggressiveness to other animals | 5 | 1 | 6 |
| Personal & family | Divorce / separation | 3 | 2 | 5 |
| General | Animal disease | 2 | 3 | 5 |
| General | Lack of space | 3 | 2 | 5 |
| Behavioral | Destructive behaviors | 4 | 1 | 5 |
| Behavioral | Aggressiveness to people | 3 | 1 | 4 |
| General | Problems with the condominium | 3 | 0 | 3 |
| Personal & family | Emigration | 2 | 1 | 3 |
| General | Too many animals | 2 | 1 | 3 |
| Personal & family | Home moving | 1 | 1 | 2 |
| Personal & family | Guardians's disease | 2 | 0 | 2 |
| General | Another reason. Which? ⁽³⁾ | 2 | 0 | 2 |
| General | Rules imposed by the landlord | 1 | 0 | 1 |
| General | Financial problems | 0 | 1 | 1 |
| Personal & family | Loss of home | 1 | 0 | 1 |
| Personal & family | Medical recommendation due to allergies | 0 | 1 | 1 |
| Personal & family | New children in the family | 1 | 0 | 1 |
| Behavioral | Constant barking / meowing | 1 | 0 | 1 |
| Behavioral | Another type of behavior problem ⁽⁴⁾ | 1 | 0 | 1 |

174 Notes: (1) The respondent could identify more than one reason of relinquishment. (2) All the other
 175 options presented in the questionnaire were not selected. (3) The following reasons were identified: The
 176 guardian was a child and the mother didn't want the dog and aggressiveness from one human towards the
 177 animal. (4) The dog was not used to being alone in the apartment.

178

179 *CHARACTERIZATION OF THE REL AND OF THE NREL COMPANION ANIMALS*

180 In total, 25 dogs and 11 cats had been relinquished by their guardian. The relinquished dogs
181 were, on average, quite large (23.8 kg; SD = 13.7 kg). A great percentage (44%) of these dogs
182 and all the cats were not microchipped and a large percentage (64%) of the companion animals
183 were intact. The relinquished companion animals were also relatively young, being the average
184 age of 4.1 years for dogs (SD = 4.5 years) and of 2.7 years for cats (SD = 3.9 years).

185 In the NREL sample there were 21 dogs and 15 cats. The adopted dogs were smaller than the
186 relinquished dogs, weighting in average 7.8 kg (SD = 7.1 kg) and relatively old (average of 6
187 years; SD = 7.1 years). The majority of the adopted dogs (71%) were microchipped, contrasting
188 with the cats, who were microchipped only in 20% of cases. The descriptive statistics of the
189 REL and NREL companion animals are presented in Table 3.

190 **Table 3. Characteristics of the relinquished companion animals (REL group) and of the**
191 **adopted companion animals (NREL group)**

| | REL | | NREL | |
|--|-----------|---------|---------|---------|
| | Dogs | Cats | Dogs | Cats |
| Total number of companion animals | 25 | 11 | 21 | 15 |
| Gender (male/female)) | 14/11 | 4/7 | 4/17 | 7/8 |
| Reproductive status (neutered/intact) | 7/18 | 6/5 | 10/11 | 10/5 |
| Microchipped (yes/no) | 12/13 | 0/11 | 15/6 | 3/12 |
| Breed (pure/mixed) | 16/9 | 0/11 | 5/16 | 2/13 |
| Color | | | | |
| Dark (black, brown, grey, black and brown) | 15 | 4 | 9 | 8 |
| Bright (white, beige, yellow) | 7 | 2 | 6 | 1 |
| Other (e.g., black and white) | 3 | 5 | 6 | 6 |
| Coat (long/medium/short hair) | 5/9/11 | 2/2/7 | 3/10/8 | 1/8/6 |
| Age (average/SD) (years) | 4.1/4.5 | 2.7/3.9 | 7.3/8.3 | 4.2/4.1 |
| Weight (average/SD) (kgs) | 23.8/13.7 | 2.7/1.3 | 7.8/7.1 | 3.7/1.3 |

192

193 3.4. STATISTICAL ANALYSIS

194 Statistical analyses were performed with SPSS version 27.0 (SPSS). Descriptive statistics were
195 derived for both guardians' and companion animals' factors and values are expressed as
196 frequency, percentage or median, depending on the type of variable.

197 Backward stepwise logistic regression analyses were performed to calculate the effect of the
198 factors influencing companion animal relinquishment. For this purpose, multiple binary logistic
199 models were run on the selected sample of participants (n = 72), as well as within the sample

200 consisting only of the guardians who had relinquished a companion animal (n = 36, dependent
 201 variable: relinquished companion animal, current companion animal). For these two populations
 202 we run one model with the group (REL, NREL) as dependent variable and one with the status of
 203 the companion animal (relinquished, current) as dependent variable, respectively. All guardian,
 204 companion animal, and companion animal management factors were initially entered into each
 205 model, with the least significant variables removed one at a time until only significant variables,
 206 associated with values of $p < 0.05$, remained. The significance of each predictor was assessed
 207 with likelihood-ratio tests. The odds ratio was calculated to evaluate the strength of the
 208 relationship. The Hosmer-Lemeshow test was used to assess the goodness of fit of the logistic
 209 regression models. The Spearman rank correlation test was used to analyze the degree of
 210 association between variables measured on a scale. The Independent-Samples Mann-Whitney U
 211 test was used to compare differences between two groups when the dependent variables were
 212 either ordinal or continuous. The Pearson's chi-squared test of independence was used to
 213 compare overall associations between categorical variables. When the expected frequency of the
 214 observations was lower than 5, the Fisher-Freeman-Halton Exact Test was used instead. A two-
 215 sided $p < 0.05$ was considered statistically significant.

216 The results from the logistic regression analyses are summarized in Table 4. As indicated by the
 217 Hosmer-Lemeshow tests, the overall fit of the model was good. When considering both
 218 participant groups (REL and NREL, n = 72), the presence of children and the type of dwelling
 219 (apartment) were the only significant predictors for a participant to be in the REL group. In
 220 particular, guardians having children and living in an apartment were respectively 4.6 and 3
 221 times more likely to be in the REL group than guardians living in a detached house and without
 222 children.

223 **Table 4. Logistic regression models predicting being a guardian who relinquished a**
 224 **companion animal (1) and being a relinquished companion animal (2)**

| Factors | B | Significance | Exp(B) | 95% CI for Exp(B) | | Hosmer-Lemeshow significance test |
|---|---|--------------|--------|-------------------|-------|-----------------------------------|
| | | | | Lower | Upper | |
| 1) Dependent variable: group (REL vs NREL) | | | | | | |

| | | | | | | |
|--|--------|-------|-------|-------|--------|-------|
| Are there children in the household? | 1.533 | 0.004 | 4.630 | 1.615 | 13.275 | 0.826 |
| Accommodation type (a) | 1.105 | 0.035 | 3.020 | 1.083 | 8.416 | 0.996 |
| 2) Dependent variable: companion animal (relinquished vs current) | | | | | | |
| Place of origin of the companion animal | -6.303 | 0.033 | 0.002 | 0.000 | 0.608 | 1.000 |

225 (a) Accommodation type (apartment, detached/semi-detached house or other).

226 Significance, $p < 0.05$; Exp(B) Exponentiation of the B coefficient (odds ratio); CI Confidence interval.

227

228 No significant results emerged in the regression model run within the REL sample (relinquished
229 vs current companion animal).

230 As for the sample of guardians who had relinquished a companion animal (REL, $n = 36$), the

231 time spent with the companion animal before relinquishing them was significantly shorter if

232 there were children in the household than if there were no children (children present vs absent:

233 median = 2, min-max = 1-73 months vs median = 15, min-max = 2-97 months; Mann-Whitney

234 U test $p = 0.045$) (Figure 1). Additionally, the time spent with the companion animal showed a

235 moderate negative correlation with the age of the companion animal at the time of

236 relinquishment (Spearman's rho -0.468 , $p = 0.004$) (Table 5). Problems with the apartment

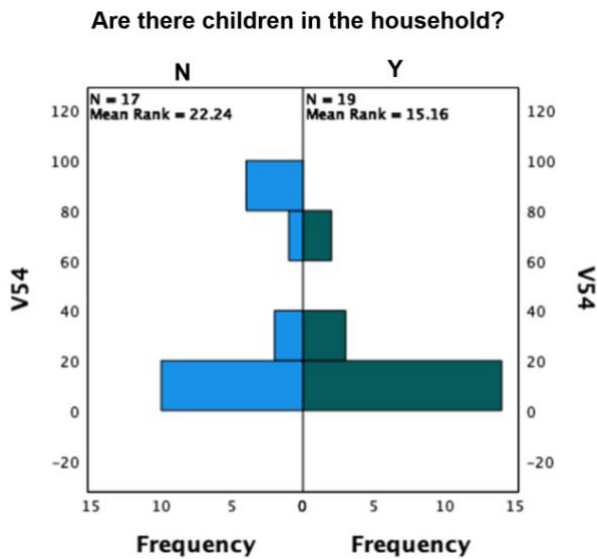
237 block, as a reason for relinquishing, were positively associated with the presence of children in

238 the household, while divorce or separation were negatively associated with both the presence of

239 children in the household and living in an apartment (Fisher-Freeman-Halton Exact Test $p =$

240 0.042 and $p = 0.004$; Table 6).

241 **Figure 1. Differences in the length of time passed with a companion animal before**
 242 **relinquishing her as a function of the presence of children in the household. (V54): How**
 243 **long have you had the companion animal before relinquish them (months).**
 244



| Independent-Samples Mann-Whitney U Test Summary | |
|---|---------|
| Total N | 36 |
| Mann-Whitney U | 98.000 |
| Wilcoxon W | 288.000 |
| Test Statistic | 98.000 |
| Standard Error | 30.951 |
| Standardized Test Statistic | -2.052 |
| Asymptotic Sig.(2-sided test) | 0.040 |
| Exact Sig.(2-sided test) | 0.045 |

245

246 **Table 5. Association between the length of time spent living with a relinquished companion**
 247 **animal and both guardian and animal factors**

| | | Companion animal age at relinquishment | |
|----------------|---|--|---------|
| Spearman's rho | How long have you had the companion animal before relinquish her (months) | Correlation Coefficient | -.468** |
| | | Sig. (2-tailed) | 0.004 |
| | | N | 36 |

** Correlation is significant at the 0.001 level (2-tailed).

248

249 **Table 6. Overall association between a reason for relinquishing a companion animal and**
 250 **guardian factors**

| Why did you relinquish the companion animal that you have collected or adopted? | Are there children in the household? | | Total |
|---|--------------------------------------|----|-------|
| | Yes | No | |

| | | | | |
|----------------------------------|--|--------------|-------------------------|-------------|
| Problems with the condominium | Count | 13a | 5b | 18 |
| | Expected Count | 9.5 | 8.5 | 18 |
| | % within Why did you collect or adopt the companion animal that you have relinquished? | 72.20% | 27.80% | 100.00% |
| | Children? | 68.40% | 29.40% | 50.00% |
| | % of Total | 36.10% | 13.90% | 50.00% |
| | Adjusted Residual | 2.3 | -2.3 | |
| Rules imposed by the landlord | Count | 1a | 1a | 2 |
| | Expected Count | 1.1 | 0.9 | 2 |
| | % within Why did you collect or adopt the companion animal that you have relinquished? | 50.00% | 50.00% | 100.00% |
| | Children? | 5.30% | 5.90% | 5.60% |
| | % of Total | 2.80% | 2.80% | 5.60% |
| | Adjusted Residual | -0.1 | 0.1 | |
| Divorce / separation | Count | 5a | 11b | 16 |
| | Expected Count | 8.4 | 7.6 | 16 |
| | % within Why did you collect or adopt the companion animal that you have relinquished? | 31.30% | 68.80% | 100.00% |
| | Children? | 26.30% | 64.70% | 44.40% |
| | % of Total | 13.90% | 30.60% | 44.40% |
| | Adjusted Residual | -2.3 | 2.3 | |
| | Value | Significance | 99% Confidence Interval | |
| | | | Lower Bound | Upper Bound |
| Fisher-Freeman-Halton Exact Test | 5.818 | 0.042 | 0.036 | 0.047 |

| Why did you relinquish the companion animal that you have collected or adopted? | Accommodation type? | | | Total |
|---|---|-------------------------------|-------------------------|-------------|
| | Apartment | Detached/ semi-detached house | | |
| Problems with the condominium | Count | 18a | 0b | 18 |
| | Expected Count | 13.5 | 4.5 | 19 |
| | Why did you collect or adopt the companion animal that you have relinquished? | 100.00% | 0.00% | 100.00% |
| | % Accommodation type | 66.70% | 0.00% | 50.00% |
| | % of Total | 50.00% | 0.00% | 50.00% |
| | Adjusted Residual | 3.5 | -3.5 | |
| Rules imposed by the landlord | Count | 0a | 2b | 2 |
| | Expected Count | 1.5 | 0.5 | |
| | Why did you collect or adopt the companion animal that you have relinquished? | 0.00% | 100.00% | 100.00% |
| | % Accommodation type | 0.00% | 22.20% | 5.60% |
| | % of Total | 0.00% | 5.60% | 5.60% |
| | Adjusted Residual | -2.5 | 2.5 | |
| Divorce / separation | Count | 9a | 7b | 16 |
| | Expected Count | 12 | 4 | 16 |
| | Why did you collect or adopt the companion animal that you have relinquished? | 56.30% | 43.80% | 100.00% |
| | % Accommodation type | 33.30% | 77.80% | 44.40% |
| | % of Total | 25.00% | 19.40% | 44.40% |
| | Adjusted Residual | -2.3 | 2.3 | |
| | Value | Significance | 99% Confidence Interval | |
| | | | Lower Bound | Upper Bound |
| Fisher-Freeman-Halton Exact Test | 14.931 | 0.004 | 0.002 | 0.006 |

251 Each subscript letter denotes a subset of “Are there children in the household?” categories whose column

252 proportions do not differ significantly from each other at the 0.04 level.

253

254 4. DISCUSSION

255 The aim of this research was to investigate variables that might explain companion animal
256 relinquishment in Portugal, with the goal of improving rational prevention strategies, namely to
257 better direct campaign messages and to improve national legislation on animal protection.

258 In the present study, relinquishment was significantly associated with the presence of children
259 in the household. In addition, the presence of children in the household was more likely to result
260 in a shorter time spent living with the companion animal before relinquishing them. The
261 increased time needed for taking care of the children might affect the attention devoted to
262 companion animals and, eventually, might result in companion animal relinquishment. Indeed,
263 in earlier studies, the lack of time to care for the animal was one of the main reasons indicated
264 by respondents to justify the relinquishment of their companion animal (Diesel et al., 2010;
265 Cardoso, 2013; Coe, 2014; Weiss et al., 2014). Kidd et al. (1992) concluded that households
266 with children were more likely than households with no children to surrender their animals.
267 Similarly, Marinelli et al. (2007) found that families living without children are more devoted to
268 their dogs.

269 Living in an apartment was also a significant predictor of relinquishment in the present study.
270 This is consistent with Mondelli et al. (2004), which found that dog guardians were more likely
271 to surrender their dog if they lived in an apartment. Living in an apartment instead of in a
272 detached or semi-detached house has also been found to result in problems related with the
273 apartment block, namely with other neighbors, due to noise pollution and other nuisances
274 (Murray & Speare, 1995; Stafford, 2007; Garcia, 2009). In this respect, in the present study,
275 problems with the apartment block, as a reason for relinquishing, was also positively associated
276 with the presence of children in the household.

277 Another relevant result from the present study is that all guardians who have given up their
278 animals had currently a companion animal and most of them wanted to have another animal
279 afterwards (92%). Such finding is consistent with that of Shore (2005) indicating that 44.3% of

280 relinquishers (a population of 78 people who had adopted and returned dogs or cats to an animal
281 shelter in a U.S. Midwestern city) planned to adopt another companion animal in the future. In
282 this regard, the Portuguese legislation, as most around the world, does not forbid the adoption
283 and guardianship of additional animals after someone was punished for the crime of illegal
284 companion animal relinquishment, such as abandoning them in the streets or similar. We
285 believe that it is necessary to thoroughly amend the legislative framework regulating the
286 guardianship of companion animal animals prohibiting the adoption and guardianship by
287 relinquishers and imposing aggravated sanctions and civic training actions aimed at respecting
288 and protecting animals. In our opinion, the characterization of the relinquishment problem could
289 be a very efficient tool in order to develop national campaigns to promote responsible
290 guardianship.

291 Even though the more common reason (50%) for the adoption of relinquished companion
292 animals was company, when we analyze the reasons for relinquishment, we found that the main
293 reason was the lack of time to care for the animal. This could be suggestive of the fact that
294 relinquishers might not have the time or the emotional commitment to keep their companion
295 animals and do not have adequate preparation or expectation for the responsible guardianship,
296 as suggested by previous research (Salman et al., 1998; Marston et al., 2004). This highlights
297 the need to develop educational tools aimed to prepare the future guardians for responsible
298 guardianship and informing adoptees about best practices before and after acquiring a
299 companion animal (Coe et al., 2014).

300 A limitation of the current study is that, despite the confidentiality and anonymity of the survey,
301 it was challenging to obtain responses from individuals that relinquished their companion
302 animals, since in answering to the questionnaire they have to internalize that what they have
303 done was an unethical and, potentially, illegal act (Law 69/2014). This limitation results in a
304 small sample size related to relinquishment (n = 105), especially when considering the division
305 between two groups (guardians – 36 – and non-guardians – 69). Even with the confidentiality
306 ensured and the adequate period of time when the questionnaire was available (19 months), the
307 number of answers obtained low.

308 Another limitation of the current study is that there were significantly fewer male than female
309 participants. This is a limitation of online surveys and surveys in general (Singer et al., 2000;
310 Smith, 2008). Contributing to this imbalance is probably the fact that the questionnaire was
311 publicized by the corresponding author directly through email and through the social media and
312 a high percentage (82%) of her followers and contacts are women. Higher levels of female
313 participation in online surveys on companion animal guardianship was observed in other studies
314 (Pirrone et al., 2015a, b; Pirrone et al., 2016; d'Ovidio & Pirrone, 2018). Therefore, further
315 research should focus on improving the tools to better obtain data about relinquishment or reach
316 relinquishers effectively.

317

318 5. CONCLUSION

319 In conclusion, it is important that potential adopters are informed, by shelters, veterinaries, pet
320 shops, breeders, and other stakeholders about realistic expectation and the conditions needed
321 before adopting or acquiring a companion animal, particularly if they have, or plan to have,
322 children. Future changes in the family structure, with the existence of children in the household,
323 is in fact a fundamental factor that should be considered when deciding to adopt a companion
324 animal. Additional steps that could minimize the choice to relinquish, might also be further
325 promoted, such as the microchipping of dogs and cats during veterinary visits, as Weiss et al.
326 (2012) argued.

327

328 CONFLICT OF INTEREST STATEMENT

329 All authors declare no conflicts of interest that could inappropriately influence, or be perceived
330 to influence, their work. The current study received no funding. The corresponding author, is
331 President of SOS Animal, a non-governmental organization (ONG) in Portugal.

332

333 AUTHORSHIP STATEMENT

334 The idea of this paper was conceived by the first author and supervised by the three last authors.
335 The research was executed by the first author in collaboration with the others. The data were

336 analyzed by the first three authors and revised by all authors. The paper was written by the first
337 author and revised by all authors.

338

339 Ethical approval was not required for this study.

340

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